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THE UNIVERSITY OF ALBERTA

THE RELATIONSHIP OF THE MAZE TO SELECTED
MEASURES OF ORAL LANGUAGE MATURITY

by



Edna M. Anderson

A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled THE RELATIONSHIP OF THE MAZE TO SELECTED MEASURES OF ORAL LANGUAGE MATURITY submitted by Edna M. Anderson in partial fulfilment of the requirements for the degree of Master of Education.

ABSTRACT

One of the frequently observed phenomena of oral language is the maze. Researchers who have collected oral samples have noted its presence and discussed it in terms of a variety of variables -- age, grade, sex, social class, I.Q., personality adjustment, the type of language in which it appeared, and, in one instance, general language proficiency. The findings have not been conclusive.

The purpose of this study was to compare maze usage with selected measures of oral language maturity. Sentence complexity and vocabulary were chosen for the language measures. In addition to comparing total maze usage with them, the maze was subdivided into the audible pause, the repeat, and the edit.

A sample of twenty-nine grade four subjects was randomly selected from the Sherwood Park school population. Oral samples were elicited from each subject, using pictures and filmstrips, and two vocabulary tests were administered.

For the measure of qualitative vocabulary, the subjects' responses to the first fifteen words of the Form L Stanford-Binet vocabulary subtest were classified according to three definitional levels, descriptive, functional, and categorical. Raw scores from the Peabody Picture Vocabulary Test were used to measure quantitative vocabulary development. The sentence complexity score was the mean C-unit length of fifty responses, selected randomly from each subject's oral samples. Maze counts were obtained from the fifty selected C-units.

Correlation coefficients (Pearson product moment) were obtained for all the variables of the study. In addition, partial correlations were computed for sentence complexity and the edit maze with the effect of I.Q. and age differences removed.

Results of the analysis indicated that the edit maze was significantly related to sentence complexity. Although the common variance between the two variables was reduced when the effects of I.Q. and age differences were removed, the relationship remained at a statistically significant level. No significant relationships were found between the maze types and either of the two vocabulary measures.

The observed relationship between the edit maze and sentence complexity warrants a deeper analysis of the nature of that relationship. The findings of the study did not indicate that a greater understanding of the other maze types would be gained by further comparisons with either sentence complexity or vocabulary.

According to the findings of this exploratory study, the assumption that maze usage correlates negatively with language maturity appears to be premature.

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CHAPTER I

THE PROBLEM, ITS NATURE AND SIGNIFICANCE

Introduction

There are obvious oral language skills to be grasped by children as they mature. Meanings must be associated with the verbal symbols that are heard and spoken, which involves the acquisition of a listening and speaking vocabulary. The child must learn acceptable pronunciation of the symbols he hears as well as how to string these symbols together in the syntactic patterns appropriate to his language group. Furthermore, increased ability to relate objects and ideas, which involves such higher level thinking skills as synthesis and evaluation, is inexorably tied to an accompanying increase in the linguistic skills needed for their expression and perhaps even their formulation.

Recognition of the existence of oral language skills raises a question for the educator -- What is the school's responsibility in the development of these skills? The emphasis of past programs appears to have developed on the premise that children entering grade one already know how to speak and, consequently, that the school's responsibility centres in the development of other areas. However, O'Donnell (1968a) noted that, although a major part of language growth occurs before school entrance, a significant portion remains for later development. Phonology, for example, although probably nearer to

completed development than any other oral language area, had not been mastered by children entering school. Templin (1957) found that not until eight years of age could the articulation of the children in her sample be considered to have reached essential maturity.

There is also research to support the assertion that development of the syntactic and vocabulary aspects of language continues beyond the sixth year, the usual school entrance age. For example, Menyuk (1961) collected samples of the oral language of children ranging in age from three years, one month to seven years, one month. Her analysis of the grammar revealed that, while all the basic syntactic structures used by adults were found in the oral language of both nursery and first grade children, sentence length had increased significantly in the older group's sample. This early maturation of the basic structures but continued increase in sentence length was consistent with Loban's (1963) findings in the oral language of kindergarten to grade six subjects.

Menyuk's further examination of features within the sentence boundary revealed a statistically significant difference between her two groups in the types of transformations used. Five of the transformations analyzed (the passive, the auxiliary "have", if, so, and nominalization) were used significantly more by first grade children than by nursery children. Of the five transformations, four were still appearing in the speech of significantly less than 100% of the first grade children. Menyuk (1961, p. 59) concluded from the latter find-

ing that further significant changes could be expected beyond the seventh year in those patterns which showed a significant increase between nursery school and first grade.

Furthermore, oral language development influences achievement in other areas. Ruddell (1963) examined the degree to which reading comprehension was affected by the similarity of his subjects' oral language patterns to the written patterns they were asked to read. He discovered that the degree of similarity was related to reading comprehension at a statistically significant level ($p < .01$). The implication is that children who have little or no mastery of certain oral language patterns will be limited in their ability to read passages containing those patterns.

The incompleteness of the language development of first grade children and the observed interaction between reading comprehension and oral language usage provide support for the promotion of oral language development as a concern of both educational research and instruction.

Oral language research has also disclosed the presence of undesirable features in children's verbalizations. One of the features, the maze, has been consistently noted in oral samples (e.g., Harrell, 1957; Francis, 1962; Riling, 1965; O'Donnell et al., 1967). The words enclosed in parentheses in the following two sentences are representative of the hesitations which these researchers have labelled as mazes: # (when when this girl she rode ov- these this these boys she the) they ran (over) right over a boy # well (h-) I know (uh some-) some-

body will tell (the ra-) a ranger probably #.

According to Shubkagle (1960), false starts, pauses to think, and editing of what is said are probably characteristic of all ages. Furthermore, Loban (1963) noted that word confusions, which were prevalent in his research, are not peculiar to the interview situation. They are present "in the daily talk of the children, in the classroom when they share experiences, and on the playground of the school" (p. 8). Similarly, Khater (1951) concluded from his research that the frequency of non-verbal sounds, repetitions, and breaks in sentences are among the most important characteristics of oral language. Loban (1963) summarized the findings with his conclusion that the frequency of maze usage has identified the maze as a phenomenon of major significance which merits further investigation into nature and causes.

Further research, in the areas of both developmental features and specific problems, is warranted. However, as the research is planned and conducted, the necessity for continual application to the educational process must be emphasized. Dixon (1967) summarized the need as follows: "An understanding of the processes involved in developing a mastery of language becomes vital when it sharpens the teacher's awareness of a pupil's potentialities, problems, and limitations" (p. 30).

The Problem

The prevalence of maze usage in oral language has been firmly established. Similarly, the assertion that it has a

negative effect upon clarity of expression would generate little controversy. Resulting from the recognition of the negative nature of maze usage have been (a) use of the maze as a measure in the evaluation of oral language maturity and (b) the development of a program which had as its purpose the eradication of the maze.

In Cleveland's 1966 study he reported that Loban had suggested the inclusion of maze usage as one measure in determining oral language maturity, assuming a negative relationship. In 1959, Munkres had outlined a program used to combat maze usage. No information was reported regarding the program's effectiveness, however, nor was her method based on findings regarding underlying factors. The latter step is required before a method for its eradication can be promoted with confidence since it is possible that maze usage is a sign of language growth rather than of inferior ability. Just as the prevalence of "and" in the writing of grade four students (Hunt, 1965, p. 11) may be labelled a problem until its place in the developmental pattern is noted, a similar danger exists when the maze is used as a measure of language maturity. An alternative possibility, that frequent use of the maze results from a vocabulary deficiency, also requires consideration.

The purpose of the present study was to explore the relationship of the maze to established measures of oral language maturity. It was hoped that the findings would provide a basis for future research on maze usage by indicating whether further investigation should examine the maze in relation to

language development variables or explore the possible influence of variables of other kinds.

The study was designed to explore or answer two questions:

- (1) Is maze usage indicative of advanced syntactic maturity for the grade level studied?
- (2) Is maze usage indicative of deficient vocabulary development?

Definition of Terms

Oral language - the spontaneous, spoken utterances made by subjects during structured interviews.

Oral language maturity - Hunt's (1965) definition of maturity was used for the purposes of this study: "Maturity designates nothing more than 'the observed characteristics of writers (speakers) in an older grade.' It has nothing to do with whether older students write (speak) better in any general stylistic sense."

Three measures of oral language maturity were examined. Since they do not represent the total range of oral language skills (O'Donnell, 1968a), they were not combined to form a composite score. The measures were:

- (a) sentence complexity - the extent of linguistic growth, determined by clause length and number of subordinate clauses.
- (b) qualitative vocabulary - depth of vocabulary development as measured by an oral recall test which was scored according to Gerstein's (1949) three defini-

tional levels.

- (c) quantitative vocabulary - breadth of vocabulary as measured by the Peabody Picture Vocabulary Test (PPVT).

C-unit (communication unit) - an utterance consisting of one main clause with all the subordinate clauses attached to it (Loban, 1963). The C-unit was used in the study as a measure of sentence complexity.

Maze - unattached words or word fragments which are not semantically or grammatically a part of a C-unit. The divisions examined, individually and in composite, were those identified by Strickland (1962).

- (a) noise - the audible pause (e.g., uh, er).
 (b) repeat - repetition of words or parts of words.
 (c) edit - word tangles resulting from a correction or change of direction.

The holder, which neither Loban (1963) nor O'Donnell et al. (1967) recognized as a maze, was omitted. Strickland (1962) suggested that its presence may be a sign of social awareness since the subjects manifested a rapid increase in its use from grade three to five, a period of total maze decrease. As such it would not be comparable to the other hesitancies included.

Design of the Study

Twenty-nine students were randomly selected from the 250 grade four students attending the Sherwood Park, Alberta elementary schools. An oral language sample was elicited from

each subject and, subsequently, transcribed and divided into C-units and mazes. Also, scores from two vocabulary tests, a qualitative and a quantitative measure, were obtained from each child.

A statistical analysis yielded means, standard deviations, correlation coefficients and probabilities of t's for thirteen variables, the first seven of which were central to the study (Appendix A). The four variables, sentence complexity, qualitative vocabulary, and quantitative vocabulary, were correlated with total mazes, audible pauses, repeats, and edits in order to identify statistically significant correlations for further investigation.

A probability rating of .05 or less was accepted as indicative of a significant relationship.

Limitations

- (1) A major limitation was the problem of obtaining a representative oral language sample. Generalizations to other language situations with the same subjects or to other grade four students cannot be made. Because the sentence complexity measure and the maze count were taken from the same samples, however, perhaps the reliability of the comparisons are less susceptible to the above criticism.
- (2) Mean C-unit length was used as the single measure of sentence complexity. Subordination index, number of clauses, and number and type of transformations within the C-unit have been noted by various researchers as indicators of

complexity. Although mean C-unit length appears to be positively related to most of these factors, the degree of loss when only length is used is unknown.

- (3) Although an attempt was made to elicit evaluative comments, the subjects' responses to the questions were meagre. Consequently, the analysis was based essentially upon one language type only, the narrative.

Outline of the Research

Chapter I has given a general introduction to the research problem and the methodology of the study. Chapter II consists of a review of relevant research, followed by research design in Chapter III and a survey of the findings in Chapter IV. Chapter V contains the summary, conclusions, and implications for further research.

CHAPTER II

A REVIEW OF THE LITERATURE

The present chapter contains a survey of the literature which is relevant to the study of the maze as it appears in oral language. The approach to the survey has attempted to incorporate the suggestions made by Gunderson (1967). She identified, as aspects for inclusion, the results of the research and a demonstration of the relationship between past research and the present proposal. The latter involves (a) indicating basic weaknesses, (b) noting how the present research was developed from leads in the previous, (c) demonstrating that the present study is significantly different from the past and (d) using the previous research as a basis for the theoretical framework, which includes the basic assumptions and the hypotheses (p. 465).

As noted in Chapter I, it has been assumed that maze usage can be included with other language variables to measure extent of language maturity (Cleveland, 1966, p. 38). Concurrent with this idea is the assumption that the less prevalent the maze the more mature the language.

The major concern of the present study, therefore, is to investigate the relationship between maze usage and selected measures of oral language maturity, with the aim of discovering if, in fact, the maze can be used as an index of language maturity at this point in its investigation.

Two variables have been chosen for comparison with the maze -- sentence complexity and vocabulary development. If the relationship between these variables and maze usage is inverse and statistically significant, the above assumption (i.e., that the less prevalent the maze the more mature the language) is supported.

The first section of Chapter II begins with an outline of the findings of past language development studies regarding mazes. Because past studies are based on a wide variety of designs, charts comparing maze definitions and sampling techniques are included. The section concludes with a summary of maze research findings.

Section two examines the rationale behind the inclusion of the other language variables chosen and the measures to be used in determining the level of the development of these variables.

The Maze

Language development studies have noted, consistently, the presence of a language feature which does not contribute to the meaning of the sentence. It has been referred to by a variety of names (e.g., word tangles, hesitancies, mazes, garbles) and has received various treatments. Despite the different approaches, however, there is agreement on one point, the prevalence of the "maze" (the term adopted in the present paper for this feature) in all types of oral language. There is a second consistent feature of the findings that makes the

maze a target for the type of research that attempts to identify variables which differentiate language abilities -- the variability among individuals and grades. Specific findings follow.

In a 1951 study (Khater), fifty consecutive responses from each of 57 kindergarten children were analyzed. The following was recognized: "Among the most important characteristics of oral language are the frequency of non-verbal sounds, repetitions, and breaks in sentences" (p. 190). Within his study, designed to identify the nature of linguistic differences existing between children of different social classes, Khater looked at four types of errors, semantic errors, morphological errors, syntactic errors, and special usages. The most frequent source of errors occurred within the syntactic group and, within this type, hesitations (mazes) were most prevalent (p. 186). Out of a mean number of 189.53 total errors, the number attributed to this particular error was 113.54 or sixty per cent.

The only statistical comparison Khater made related to hesitations was between hesitations and social class. His subjects were chosen to represent the two extremes, upper and lower class. While the direction of the relationship between social class and hesitancies was in favor of the upper class, i.e., fewer hesitancies characterized their speech, the trend was not significant. This was true despite the fact that many of the other error types were significantly related to class.

As noted, no other figures are compared for statistical significance. However, if one juxtaposes the data from two of

Khater's tables a consistent trend is revealed (Table 1). The mean length of the sentence and the mean number of hesitations spoken are moving in the same direction.

TABLE 1
SENTENCE LENGTH AND HESITATIONS --
KHATER (1951)

Subjects (in decreasing order of mean number of words per sentence)	# of Words per Sentence	Mean # of Hesitations
Lower Class Boys	8.69	27.91
Lower Class Both	8.13	22.02
Upper Class Boys	7.64	17.65
Upper Class Both	7.52	16.03
Lower Class Girls	7.52	15.78
Upper Class Girls	7.38	14.15

Excerpt from Khater, 1951, p. 173, Table 34 and p. 189, Table 40.

Harrell (1957) studied the relationship between oral and written language at four grades, four, six, eight, and ten. Age was standardized so the grade four subjects were 9 1/2 years old, the grade six, 11 1/2, the grade eight, 13 1/2, and the grade ten students, 15 1/2. Although his purpose was not to examine the maze, he found it so amply represented in the narrations elicited following a viewing of a ten minute black and white film that he devoted a section to it. A summary of his findings follows:

(1) There was a steady decrease in maze usage as age/grade

increased. This was true for both boys and girls. (e.g., The percentage of mazes used by 9 1/2 year old subjects was 15.8% of the total words spoken; for 15 1/2 year old subjects it was 8.1%.)

- (2) Large variations existed within each age, as illustrated by the following sampling of means and standard deviations reported by Harrell, p. 31:

		Mean	Standard Deviation
Gd. 4:	Boys	47.1	28.1
	Girls	48.0	28.2
Gd. 10:	Boys	31.7	20.9
	Girls	30.0	25.6

- (3) No significant differences existed between the sexes.
- (4) The "audible pauses" contributed little to the analysis. They constituted only a small portion of the total maze usage and varied little from one age group to another. (The highest subgroup mean was 4, the lowest was 2.)

Degraff (1961) gave a lengthy discussion of the maze, examining it in terms of four subdivisions, the noise, holder, repeat, and edit. For oral language samples of equal length the total number of mazes used increased from 336 to 490 (grade one to three), then decreased to 272 for the grade five sample. No attempt was made to correlate these findings with anything but grade.

A discussion on Degraff's findings for the subdivisions is difficult in terms relevant to the present research. All figures given are in terms of percentages based on the total within each grade. This can be misleading. For example, the

percentage of the edit maze used in grade one was 21.13, in grade three 13.89, and in grade five 18.75. These figures give the impression that use of the edit maze decreased from grade one to three, then increased at the grade five level. However, the calculation of raw scores, which are comparable because of the standardization of number of sentences for each grade, revealed that there was a steady decrease throughout the grades (71, 69, 52).

No information was given regarding the distribution of its use within grades. Considering the findings of both earlier and more recent research regarding the variability within grades of both the maze and other language features, such information, had it been given, may have suggested that an analysis of a different kind might yield more insight into the operation of this particular oral language feature.

The above findings are based on the language recorded in an informal, unstructured situation. For comparative purposes, Degraff also obtained, from his twenty subjects at two of the three grades originally included, oral language in a more formal, structured environment.

No consistent trends were revealed by a comparison of the two resultant language samples. At the grade three level the structured situations yielded fewer noise mazes, but at the grade five level, the reverse was true. Use of the holder maze was reversed but also inconsistent -- more in the structured situation in grade three, less in grade five. Repeat and edit mazes were used by the grade three subjects more frequently

in the structured situation than in the unstructured setting; the use of these two maze types was about the same for the grade fives.

This apparent lack of a clear pattern can be contrasted to the one statement that was able to be made regarding the length of the structural unit: "An increase in the number of words used per structural unit was found in the formal situations over that recorded in the informal situations" (Degraff, 1961, p. 169). This consistent finding for the two grades (9.28 versus 8.55 at the grade three level and 9.51 versus 9.36 at the grade five level, p. 118), when compared to the inconsistency of findings related to the maze, leads one to suspect that if there is a relationship to be found between maze usage and other language variables it may differ at various grade and developmental levels.

Francis (1962) and Shubkagle (1960), two members of a project team under the direction of Ruth G. Strickland, examined oral language at grade one and grade three respectively. Both researchers noted the presence of what they referred to as non-structural elements. Francis did not examine them but simply made the suggestion that the types and uses of these elements merited investigation. Shubkagle, on the other hand, attempted to find possible relationships. On the basis of the analysis of a total sample of 2163 phonological units (within which 2118 mazes appeared) elicited from 100 grade three children, Shubkagle drew the following conclusions:

(1) Although the girls tended to use more mazes than the boys,

there was little difference in maze usage by sex.

- (2) Subjects in the three highest I.Q. groups (I.Q. = 110 to 139) used fewer mazes than those in the lowest three groups (I.Q. = 70 to 99). (An examination of Shubkagle's seven I.Q. subdivisions, however, revealed that the decrease in maze usage from low to high I.Q. was not a consistent trend. For example, subjects with I.Q.'s from 120 to 129 (N = 14) averaged 22.57 mazes; subjects with I.Q.'s from 90 to 99 (N = 18) averaged 21.33 mazes (Shubkagle, 1960, p. 54).)
- (3) Children in the lowest occupational groups used more mazes than children in the higher groups.
- (4) A large number of mazes was used by all the children in the sample.

A major language development study was reported by Loban in a 1963 publication which outlined the findings of a longitudinal six-year study of elementary school children's oral language. Maze findings were compared in two ways: on the basis of grade and between high and low language ability subgroups. Because of the significance of the maze usage and Loban's interpretation of it, the table is reproduced below (Table 2).

One of Loban's key findings was that children who are rated as skillful in language reduced their incidence of mazes (p. 82). It was probably on the basis of this conclusion that he suggested to Cleveland, as one of the categories which would be valuable in measuring language growth, the following: "de-

TABLE 2
PERCENTAGE OF MAZES OCCURRING IN RELATION TO
COMMUNICATION UNITS -- LOBAN (1963)

Grade	High Subgroup	Low Subgroup	Total Group
K	22.55	32.07	25.38
1	21.80	39.29	25.16
2	14.69	26.30	19.90
3	13.69	25.54	18.67
4	23.82	31.63	28.33
5	23.27	32.51	29.74
6	25.75	32.09	32.06

Excerpt from Loban, 1963, p. 33.

crease in the number of mazes" (Cleveland, 1966, p. 38).

One element in the reproduced table supported this conclusion. At each grade, the high subgroup consistently used fewer mazes than the low subgroup. However, to assume that a decrease in maze usage can be a measure of language growth is to ignore what has happened within the subgroups. In the high subgroup, the decrease was consistent from kindergarten to grade three. But at the grade four level the percentage of maze usage jumped to a level above that of the kindergarten sample and remained near this level for the remainder of the elementary grades. The results of the low subgroup were more erratic but there was a definite jump at the fourth grade level as well. Assuming there were no sampling or measurement errors to account for this jump, there was a reversal of the maze trend at the particular stage of development into which Loban's fourth grade

subjects fell. Consequently, to compare, for example, a student whose development approximates Loban's third grade subjects and another student at the fourth graders' level by the measuring device suggested would contribute erroneous information to a comparison of developmental levels.

This observation would suggest that further investigation is required into the unique characteristics of the maze at various developmental levels before the nature of its usefulness as a measurement of language development can be ascertained.

Loban also examined the percentage of words in mazes in relation to total words. For the high group the findings were similar to the percentage of mazes used -- a steady decrease from kindergarten to grade three, with a jump in length at grade four. No clear trend was apparent from the erratic behaviour of this feature in the language of the low group.

Riling (1965) compared the narrative oral and written language of grade four and six students with the language of their textbooks. Because of the prominence of the maze in the oral language sample she made a specific analysis of this feature. Her findings follow:

- (1) The use of the maze was very widespread, with no child using no mazes.
- (2) Because the grade six subjects used fewer mazes than the grade four subjects, Riling concluded that the use of mazes is partially related to maturity of language.
- (3) Grade four Negro subjects used fewer mazes than grade four Caucasian subjects. (Two possibly significant addi-

tional facts about these groups are that the Negro subjects were slightly older and received lower reading scores in paragraph comprehension than did the Caucasian subjects.)

- (4) Rural subjects used fewer mazes than urban subjects.

(Riling's finding needs to be considered in terms of another language variable -- the rural group was lowest on a silent reading test of paragraph comprehension and word meaning. Since reading scores have frequently equated with general language ability (e.g., Loban, 1963, p. 85), perhaps it is the group of lowest ability who are using the fewest mazes.) Riling's suggestion, based on his finding, was the following: "It is possible that fluency in use of language in the lower grade is a sign of satisfaction with one's attainment in use of language, and as such, it can be a barrier to further progress in language development" (p. 75).

- (5) Boys used more mazes than girls. (This finding disagrees with those of Harrell (1957) and Shubkagle (1960), who both found no significant differences. Two possible explanations are the following: Both the age levels and the situations in which the oral language was elicited varied. For example, Shubkagle recorded the language for her analysis from children who were sitting in a group talking informally. Harrell's and Riling's situations were more formal, a one-to-one relationship with the examiner in which the subject was asked to respond to visual

stimuli. Even the extent of differences that existed in the latter two situations is not known. Harrell's subjects responded to a soundless film; Riling's subjects responded to one picture.)

- (6) A significant relationship existed between personality adjustment and use of the maze for grade six Caucasian girls only ($p < .05$).

Riling concluded that fluency with language (as measured by the absence of mazes) did not seem to be a reliable index of language maturity.

O'Donnell, Griffin, and Norris (1967) charted their subjects' use of garbles (mazes) to facilitate comparisons in terms of grade, sex, and the range within each grade. (They had thirty subjects from each of kindergarten, and grades one, two, three, five, and seven.) Their conclusions follow:

- (1) There was no consistent pattern of sex differences.
- (2) While children in the lowest grades used garbles most frequently, elimination of this feature was neither consistent nor dramatic in the older grades.
- (3) Wide ranges of garbles occurred within every grade.
- (4) Most of the garbles at every grade were attributable to a few individuals.

The last three findings suggest that grouping on the basis of grade is not adequate. O'Donnell et al. suggested that the study of the expression of individuals might clarify the relation between freedom from garbles and other aspects of children's language control (1967, p. 40).

The research of Levin, Silverman, and Ford (1967) was designed to investigate the relationship between thought and speech, their concern being the effect of different thought patterns upon the hesitations appearing in speech. To accomplish this, the productions from two types of questioning were compared. In the first situation simple description was obtained from the subjects with the question, "What happened?" Secondly, "Why do you think that happened?" was asked to elicit explanation. The finding was as predicted. The hesitancies of the explanatory situation were greater than those of the descriptive at a statistically significant level.

The three researchers had intended to examine different types of mazes in terms of the kind of thinking required in the oral language sampled. Unfortunately, analysis of these divisions were not possible because of insufficient data. This lack is understandable when the size of the oral language sample is noted. Average number of words per subject for the "description" portion was 15.21 and for the "explanation," 55.96. The conclusion noted in the previous paragraph must also be considered within the limitations that such a small sample places upon it.

The findings on the maze are inconclusive and occasionally inconsistent. Much of this discrepancy probably can be explained in terms of variant definitions, measures, and sampling techniques. Because of the lack of agreement in these areas, Figures 1 and 2 are included to provide the information necessary for making comparisons among the designs. The definitions

given to the "maze" by each of the studies discussed earlier are summarized in Figure 1. Descriptions of subjects and oral language sampling techniques comprise Figure 2.

The diverse nature of the information given in Figures 1 and 2 cautions against any conclusive statements regarding the nature of the maze as an oral language feature. However, suspected trends can be gleaned from the available information.

- (1) Studies which examined different types of mazes individually revealed that one type did not always relate to language variables in the same way as did other types (e.g., Degraff, 1961).
- (2) Distribution of the maze among subjects of the same grade is uncertain. Perhaps the discrepancy between O'Donnell's samples and those of Riling and Shubkagle can be explained in terms of the different language patterns that were included in the term "maze."
- (3) Findings related to the relationship between age and/or grade and maze usage are inconclusive. Harrell (1957) and Riling (1965) discovered a consistent decrease in use of the maze as age and grade increased. However, the findings of Degraff (1961), Loban (1963) and O'Donnell et al. (1967) showed a lack of consistency in this trend.
- (4) Findings cannot be generalized from one type of language to another. Degraff's two samples were elicited in structured and non-structured situations; Levin's situations required two different types of thinking. In both studies, maze usage was not consistent between the two types.

FIGURE 1

THE MAZE - AS DEFINED BY VARIOUS ORAL LANGUAGE STUDIES

STUDY	NON-STRUCTURAL ELEMENTS (identified in terms of Strickland's subdivisions)	VARIABLES WITH WHICH THE MAZE WAS CORRELATED
Strickland, 1962 (also Shubkagle, 1960; Degraff, 1961; Francis, 1962)	<p>"mazes" - vocalizations not syntactically or meaningfully pertinent.</p> <p>audible pauses (noises)</p> <p>- unintelligible sounds such as "ah," and "er."</p> <p>holders</p> <p>- the use of such words as "well," "you see," and "now uh" to hold attention.</p> <p>repeats</p> <p>- repetition of words such as "you-you," "I think--I think."</p> <p>edits</p> <p>- words used by the speaker which indicated a correction or change of direction.</p>	<p>Degraff:</p> <p>grade (1, 3, and 5)</p> <p>structured versus non-structured situations for oral language sampling</p> <p>Shubkagle:</p> <p>sex</p> <p>I.Q. (as measured by the California Short Form Test of Mental Maturity, Primary Grades</p> <p>occupational groups (as measured by the Minnesota Scale for Paternal Occupations)</p>
Loban, 1963	<p>"mazes" - series of words or initial parts of words which did not add up, either to meaningful communication or to structural units of communication.</p> <p>Analysis used only the total maze score, which included audible pauses, repeats, and edits.</p>	<p>grade (kindergarten to 6 inclusive)</p> <p>language ability (high and low subjects selected by weighting equally a 100-item vocabulary recognition test and a combined K-6 teachers' rating score</p>

FIGURE 1 (CONTINUED)

STUDY	NON-STRUCTURAL ELEMENTS (identified in terms of Strickland's subdivisions)	VARIABLES WITH WHICH THE MAZE WAS CORRELATED
Khater, 1951	<p>"hesitations" - non-verbal sounds, repetitions, and breaks in sentences.</p> <p>Analysis used only the total hesitation score.</p>	<p>class (kindergartens were chosen to represent upper and lower class areas, then each child was analyzed according to the Index of Status Characteristics (occupation, source of income, house type, and dwelling area) and subjects who were nearest the two extremes were chosen.)</p>
Harrell, 1957	<p>"unrelated words" - included audible pauses, repeats, and edits.</p> <p>Analysis used only the total word score.</p>	<p>grade (age) (9 1/2-grade 4; 11 1/2-grade 6; 13 1/2-grade 8; 15 1/2-grade 10) sex</p>
Rilling, 1965	<p>"mazes" - Strickland's definition and subdivisions.</p>	<p>grade (4 and 6) Negro and Caucasian at grade 4 rural and urban sex personality adjustment (as measured by the California Test of Personality - 1953 Revision, Elementary Form AA)</p>

FIGURE 1 (CONTINUED)

STUDY	NON-STRUCTURAL ELEMENTS (identified in terms of Strickland's subdivisions)	VARIABLES WITH WHICH THE MAZE WAS CORRELATED
Hunt, 1965 (written)	"garbles" - any group of words that could not be understood by the investigators	grade (4, 8, and 12)
O'Donnell <u>et al.</u> , 1967	"garbles" - false starts, redundant subjects, word tangles and non-communicative repetitions. Analysis used only the total garble score, which included repeats and edits. (Audible pauses and holders were excluded.)	grade (kindergarten to 3, 5 and 7) sex
Levin <u>et al.</u> , 1967	"hesitations" - Strickland's definition. The plan was to analyze according to Strickland's subdivisions plus a further division of the edit into (1) the "correction" edit e.g., "the three bears--no the four..." (2) the "incomplete" edit e.g., "and he uh not too many uh and that's the end"	description (oral language obtained with the question, "What happened?") and explanation (oral language obtained with the question, "Why do you think that happened?")

FIGURE 2

ORAL LANGUAGE RESEARCH DESIGNS - SELECTED STUDIES

STUDY	SUBJECTS	ORAL LANGUAGE SAMPLING
Degraff, 1961	<p>60 subjects.</p> <p>125 students were randomly selected from a school system's total population at each of three grade levels, first, third, and fifth. From this group, those who met the following criteria were selected: (a) having an I.Q. between 90 and 110, as measured by the California Short-Form Test of Mental Maturity, (b) of the middle socio-economic range, as measured by the Minnesota Scale for Paternal Occu-<u>pations</u>, and (c) having progressed at the normal rate through the grades.</p> <p>The result was a population of 20 subjects per grade for the first phase of the study.</p> <p>The secondary study of different language environments consisted of 10 subjects from each of grades 3 and 5.</p>	<p>Unstructured situation:</p> <p>Free and random speech was elicited from groups of two or three children by questioning about family and recreational interests and with the use of familiar figurines representing story book characters.</p> <p>From the resulting verbalizations, 25 consecutive structural units were selected for each child, resulting in 500 sentences at each grade for the analysis.</p> <p>Structured situation:</p> <p>Each subject told a story motivated by the film, <u>The Hunter and the Forest</u>. The total response was analyzed because no one spoke over 25 sentences.</p>

FIGURE 2 (CONTINUED)

STUDY	SUBJECTS	ORAL LANGUAGE SAMPLING
Shubkagle, 1960; Francis, 1962	<p>Shubkagle: 100 third grade children, chosen randomly from a Midwestern U.S. population of 573.</p> <p>Francis: 100 first grade children, 47 boys and 53 girls.</p>	<p>Same as Degraff's unstructured situation. The 25 consecutive units were begun where the subject was speaking with the most spontaneity and with little or no adult stimulation (as was also true of Degraff's sampling).</p>
Loban, 1963	<p>338 subjects, drawn from eleven kindergartens, stratified on the basis of SES, sex, racial background, and intellectual ability.</p> <p>Two subgroups were chosen from the total sample, one of high language ability and one of low ability.</p>	<p>The subjects responded to a series of 6 pictures. The total response of each was analyzed.</p>
Khater, 1961	<p>57 kindergarten children, chosen to represent the two extremes of social class, upper and lower.</p>	<p>The language was elicited in two types of group activities, a fifteen minute conversation and two fifteen minute discussion periods in which the teacher presented a problem and each child responded to it in turn.</p> <p>50 consecutive structural units per subject were analyzed.</p>

FIGURE 2 (CONTINUED)

STUDY	SUBJECTS	ORAL LANGUAGE SAMPLING
Templin, 1957	480 subjects, 60 at each of the following age levels: 3, 3.5, 4, 4.5, 5, 6, 7 and 8. Attempted control of age, sex, I.Q. family constellation, language spoken at home, bilingualism, twinning, impaired I.Q., and defective hearing.	50 verbal utterances, usually consecutive, were chosen from responses to picture books and toys. Transcription - long hand.
Harrell, 1957	320 white, English speaking grade 4, 6, 8, and 10 students (ages 9 1/2, 11 1/2, 13 1/2, and 15 1/2 respectively) with no apparent speech defects--40 subjects of each sex per grade.	A ten minute black and white film, <u>The Three Bruins in the Woods</u> , was used to elicit the oral language. The total response of each subject was analyzed.
Riling, 1965	300 subjects, from a Southwestern U.S. area, chosen to represent grades 4 and 6 and, at grade 4, Negro and Caucasian. (100 from each of three groups: grade 4 Caucasians, grade 4 Negroes, and grade 6 Caucasians.)	Each subject responded individually to one picture. Their total responses, to a maximum of 25 phonological units were included in the analysis.
Hunt, 1965 (written)	57 subjects, 9 of each sex at grades 4, 8 and 12. Average I.Q.: 90-110.	The sample consisted of the first 1000 words written under teacher supervision during the year of the study. No constraint on subject matter.

FIGURE 2 (CONTINUED)

STUDY	SUBJECTS	ORAL LANGUAGE SAMPLING
O'Donnell et al., 1967	30 subjects at each level, kindergarten, and grades 1, 2, 3, 5, and 7 (approximately 15 of each sex--the only control).	Each subject responded to two short films, <u>The Ant and the Dove</u> and <u>The North Wind and the Sun</u> , by telling the story and answering preplanned questions. (Grades 3 to 7 responded in writing also.) The total response of each subject was analyzed.
Levin et al., 1967	24 subjects, 6 at each of four grade levels, kindergarten, second, fourth, and sixth, chosen from one school serving an "upper middle-class neighborhood." (3 boys and 3 girls from each level.)	Following three brief physical demonstrations, each subject responded to two types of questioning. - "What happened?" to elicit description. - "Why do you think that happened?" to elicit explanation. The total response of each subject was analyzed.

FIGURE 2 (CONTINUED)

STUDY	SUBJECTS	ORAL LANGUAGE SAMPLING
Bougere, 1968	60 first graders, 5 of each sex from six schools. Wide SES range.	Analysis was based on the taped responses to a series of illustrations and two films. The subjects viewed each film, told about it, then answered interpretive questions. Presentation of the four illustrations followed. Source of illustrations: the reader, <u>Fun with Our Friends</u> . Interviews: individual.

- (5) Sex and use of the maze do not appear to be related.

Three of the four studies that included sex as a variable found no significant relationship with maze usage.

- (6) The relationship between social class and use of the maze is not clear. Khater (1951) discovered no significant difference between social groups while Shubkagle reported that children in the lowest occupational groups used more mazes than children in the highest groups.

- (7) Loban (1963) and Degraff's (1961) data indicated that relationships between maze usage and other language variables may not be consistent across developmental levels.

- (8) A relationship between I.Q. and use of the maze was reported in the one study that equated the two (Shubkagle, 1960). As noted previously, however, the finding was not conclusive.

Language Variables for Comparison with the Maze

Research findings related to the maze have been discussed in the previous section. Section two contains a discussion of the language measures used for comparison with maze usage.

The first task was to examine past research in an attempt to discover the most valid measures of language performance and production. Two types of studies were included for this purpose, the comparison of language performance across grades and the longitudinal study.

Task number two was a justification, based on the examination of past research, of the specific devices used to measure

the language variables chosen.

(1) Sentence Length as a Measure of Growth in Language Performance

Mean sentence length has a long history as a measure of growth in language performance. Davis used it to compare the language development of twins and singletons in 1937. Three years later, it was one of the measurements by which the influence of different socio-economic environments upon language development was determined (Young, 1941), and in 1966 it was used by Artie and Giles to measure and compare the oral language of head start and non-head start students. McCarthy (1954) listed the findings of fourteen such researchers, whose work encompassed the period from 1926 to 1953, all of whom analyzed their data for mean length of sentence.

Concurrent with the use of mean sentence length as one determiner of language growth, studies were designed to test the validity of its use for this purpose.

In 1925, Nice concluded a clinical study with the statement, "This average sentence length may well prove to be the most important single criterion for judging a child's progress in the attainment of adult language" (p. 378). The research that formed the basis for this conclusion consisted of a sample of English speaking children at ages varying from two to ten years. The results revealed that this group included children who ranged in language performance from the one word stage to the complete sentence. Unfortunately, the sentence was not

defined, although an examination of raw data revealed that all the whole sentences given as examples consisted of main clauses with their modifiers. Likewise, the stimuli and procedures for collecting the oral language and the length of the oral sample were not standardized. Keeping these limitations in mind, the over-all trend toward the use of longer responses with increased age is apparent by scanning the table which compares mean length of sentence and age in one-half year divisions (p. 372).

While no generalizable conclusions can be drawn from findings based on a case study approach, information of this nature may have acted as a catalyst for later researchers. Several studies since that time have attempted to verify, by multi-grade comparisons and longitudinal studies, the validity of using mean sentence length as a measure of language growth. An examination of five of these multi-grade and longitudinal studies follows.

Because of the danger inherent in comparing research which uses the same label for a variable defined in different ways, Figure 3 outlines the definition given by each researcher to "mean length of response."

Harrell (1957), in a study designed to investigate the relationship between certain aspects of oral and written language expression, used as his principle measure "the ratio of subordinate clauses to the total number of clauses a child uses." This subordination index increased steadily from a mean of 11.6 at the grade four level to 18.6 at grade ten.

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FIGURE 3
MEAN LENGTH OF RESPONSE - AS DEFINED BY
VARIOUS LANGUAGE STUDIES

STUDY	INTERPRETATION OF "LENGTH OF RESPONSE"
Nice, 1925	"sentence" - not defined. (From examples - main clause with its modifiers.)
Khater, 1951	"sentence" - a group of words identified as a unit by the inflection of the voice.
Harrell, 1957	"clause" - a group of words that formed part of a sentence and that contained a subject and a predicate. (2 exceptions: each predicate was a separate clause and elliptical clauses counted as complete clauses.)
Templin, 1957	"utterance" - a unit of speech determined by the subject's natural break in verbalization (e.g., 2 simple sentences juxtaposed with no pause would be one utterance).
Degraff, 1961	"structural unit" - syntactically determined units usually composed of independent predication.
Strickland, 1962	"phonological unit" - a unit of speech ending with a distinct falling intonation which signals a terminal point (may contain one or several "C-units").
Loban, 1963	"C-unit" - the grammatical, independent clause with any of its modifiers.
Hunt, 1965	"T-unit" - one main clause and any of its subordinate clauses.
O'Donnell <u>et al.</u> , 1967	"T-unit" - Hunt's definition.

A second measure used by Harrell was average length of clauses. The nominal change in clause length from group to group (9 1/2 years - 6.76; 11 1/2 - 6.81; 13 1/2 - 7.00; 15 1/2 - 6.98) may be partially explained by Harrell's definition of the clause (Figure 3). Counting a compound predicate as two clauses, which would result in shorter mean clause length for the subjects who were combining ideas in this manner, constituted an information loss since the embedding required for the compound predicate resulted in a more complex sentence, yet the speaker was penalized for so doing.

On the basis of Harrell's study, subordination index appears to be a reliable index of language maturity.

Templin (1957) conducted research which provided insight into the growth of, among other language features, two aspects of oral language, sentence structure and vocabulary. Her evaluation of sentence structure consisted of a comparison among ages of mean length of response. The result of the analysis (Table 3) revealed a consistent increase from one age division to another.

Strickland (1962) summarized research conducted at three age levels, grades one, four, and six. Since mean sentence length had been analyzed at each of these grades, Strickland compared the analyses, reproduced in Table 4, discovering that the length of response increased consistently from grade to grade.

Likewise, Loban's (1963) findings regarding mean length of response supported the inclusion of this criterion as a

TABLE 3
MEAN LENGTH OF RESPONSE AND AGE --
TEMPLIN (1957)

Age	Mean Length of Response	S.D.
3	4.1	1.3
3.5	4.7	1.0
4	5.4	1.5
4.5	5.4	1.3
5	5.7	1.5
6	6.6	1.3
7	7.3	1.0
8	7.6	1.6

Excerpt from Templin, 1957, p. 79.

TABLE 4
MEAN LENGTH OF RESPONSE AND GRADE --
STRICKLAND (1962)

Grade	Mean Length of Response	Range within Grade
1	10.87	1.92-22.56
4	12.67	7.36-20.40
6	14.04	4.60-26.32

Excerpt from Strickland, 1962, p. 26.

measure of language maturity. As Table 5 illustrates, the average number of words per communication unit increased consistently from kindergarten to grade six.

TABLE 5
MEAN LENGTH OF RESPONSE AND GRADE --
LOBAN (1963)

Grade	Mean Length of Response	S.D.
K	4.81	1.33
1	6.05	1.37
2	6.57	1.18
3	6.65	1.81
4	7.70	1.26
5	7.89	1.10
6	8.37	1.25

Excerpt from Loban, 1963, p. 28, Table 1.

Loban also analyzed the output of two subgroups, one exceptionally low in language ability. (These two groups were selected on the basis of two factors, a vocabulary test administered at the kindergarten level and four years of teacher ratings.) The results of an analysis of these statistics showed the same trend as those obtained for the total group of subjects. For the high group the increase in mean length of response was from 5.76 at the kindergarten level to 9.48 at grade six; the increase for the low group was from 4.18 at the kindergarten level to 7.19 at grade six (Loban, 1963, pp. 30, 31).

In 1967, O'Donnell, Griffin and Norris analyzed the oral language of subjects at five age levels. The results were consistent with those of previous researchers (Table 6). There was a continuous increase in mean length of response from kinder-

TABLE 6
 MEAN LENGTH OF RESPONSE AND GRADE --
 O'DONNELL et al. (1967)

Grade	Mean Length of Response	Range
K	7.07	4.0- 9.5
1	7.97	5.2-10.1
2	8.33	6.3- 9.8
3	8.73	7.4-10.8
5	8.90	7.6-11.5
7	9.80	8.1-12.7

Excerpt from O'Donnell et al., 1967, p. 45,
 Table 7.

garten to grade 7.

The findings of the above studies support the use of the following measures in the determination of oral language maturity: mean length of response and subordination.

Standardization of mean length of response. A standardized measure of sentence length is needed before mean length of response can be a fully usable research measure, however. Hunt made an attempt at standardization for written language in 1965. Working at three grade levels, he proposed the use of the "terminal unit" (T-unit) as a measure of language maturity. Since this unit as defined by Hunt consisted of one main clause and any of its subordinate clauses, it preserved all subordination of clauses and all coordination of words, phrases, and subordinate clauses, while eliminating the coordination of main clauses.

This latter restriction is an advantage according to Hunt's finding regarding main clause coordination, i.e., that grade four students used this device more frequently than older students did (Hunt, 1965, p. 11). Furthermore, while this coordination is eliminated from the analysis, all the structures that O'Donnell et al. (1967) listed as the best indicators of maturation, "the use of adverbial infinitives, sentence adverbials, coordinations within T-units and modifications of nouns by adjectives, participles, and prepositional phrases" (p. 90), are retained.

A finding of O'Donnell (1968b) supported the use of the T-unit. He observed that at three different grade levels the growth patterns of the two features involved in the T-unit measure varied. At the lower grade levels, both clause length and number of clauses per T-unit increased; at the higher grade levels, most of the increase in length was attributable to clause lengthening. In Hunt's study, the latter finding was true between grade twelve students and superior adults. Since T-unit is actually a combination of clause length and number of clauses per T-unit (Hunt, 1965, p. 37), provision is made in the measure for these two significant growth patterns.

In Loban's (1963) earlier examination of oral language maturity, he had adopted an identical means of determining the sentence division, calling it a communication unit (C-unit). He defined it as "the grammatical independent clause with any of its modifiers" (p. 7).

(2) Vocabulary Development as a Measure of Growth in Language Performance

In the past, performance on a vocabulary test often has served the purpose of providing an estimate of language maturity (Ebel, 1969). Currently, although the study of language development is concerned with the acquisition of language as a system, an article edited by Ebel maintains that "vocabulary ...in many practical respects remains an index of development outweighing all others" (p. 693).

Quantitative vocabulary. Quantitative measures have been one approach to the analysis of ability in vocabulary. Loban (1963) made use of the measure, stating that "the ability to find words with which to express oneself - and to find them readily - is normally one mark of success with language" (p. 29). Consequently, a quantitative vocabulary test was one of the two measures he used to select his high and low language groups.

Templin (1957) examined children from three to eight with one purpose being the description of vocabulary growth. Two recognition vocabulary tests were used. The Seashore-Eckerson English Recognition Vocabulary Test, a multiple choice test, was administered to children six to eight years of age; the Ammons Full-Range Picture Vocabulary Test was administered to children aged three to five. (For the latter test the score was the number of words correctly identified.) The results showed a continuous rise at each consecutive age for both groups.

Templin also measured vocabulary of use by tabulating the

mean number of different words in each subject's fifty utterances. A comparison between the two types of measures, the recognition vocabulary test and the vocabulary of use count, revealed that the correlation between them decreased with increase of age. It is conceivable that the reason may be related to the fact that vocabulary of use is being compared with two different vocabulary of recognition tests.

Templin, however, suggested that at the older ages the samples of language obtained may not have been long enough for the larger vocabulary of use to become apparent. If this hypothesis is true, reliance upon a vocabulary of use measure should be restricted to research which has as its base a large corpus of data.

Since both recognition vocabulary tests were positively correlated with age at all levels measured, the latter type of test seemed preferable and was used in the present research.

The specific standardized measure used in the study was the Peabody Picture Vocabulary Test, Form A. An easily administered individual test, it consists of four stimulus pictures for each word to be tested. When the stimulus word is read, the subject responds by pointing to, or giving the number of, the pictures best illustrating the word (Dunn, 1965).

Piers labelled the test as "probably the best of its kind" (Buros, 1965, p. 532). At age ten, it has a reliability coefficient, for raw scores, of .77 (Dunn, 1965, p. 30). The main restriction on content validity is the use of only those words which can be pictured; the item validity is verified by

the progressively harder nature of the items, as illustrated during the standardization of the test (Buros, 1965).

Qualitative vocabulary. Reichard, Schneider, and Rapaport (1944) conducted a study in which they attempted to distinguish methods of forming concepts. A sorting test which required the subject to define groupings of objects was administered and the responses analyzed. From this information, categorization according to three levels was indicated. The lowest form of conceptualization was the "concretistic," based on non-essential incidental features. The second approach was definition on the basis of function or use (the "functional" description). The third and highest form was the abstract "conceptual" definition (p. 157).

Gerstein (1949) translated these performance divisions into the vocabulary realm, assuming that definitional levels could be classified by the same criteria. The result, based on an analysis of responses to the Wechsler-Bellevue Vocabulary Test, was a classification of three comparable vocabulary levels. The first, consisting of descriptive responses, implies memory of an object at the concrete, sensory level (e.g., juggler - "a man who juggles things"). At the functional level, the object is defined by the use to which it is put (e.g., eyelash - "it protects your eye"). Finally, the ability to abstract is illustrated at the conceptual level (e.g., Mars - "a planet up in the universe"). Jackson (1968) included a number of categories under each level as an aid to qualitative classification of vocabulary responses (pp. 60-62).

Feifel and Lorge (1950) used a similar approach to Gerstein's in analyzing the words of the Form L Stanford-Binet vocabulary sub-test. This test is appropriate for qualitative analysis because the words allow differences to show themselves in the responses, although a full range of differences is limited to the easier part of the list. (Since only the first fifteen words were used for the present research, the problem of the restricted nature of the latter definitions was avoided.)

The findings of the Feifel and Lorge study revealed a qualitative difference between the definitions of the younger and older children -- the younger tended to perceive words as concrete ideas, emphasizing their isolated or particular aspects; the older children had a superior understanding of abstract or class features of words (p. 17). Therefore, Feifel and Lorge concluded that definitional level can provide insight into the child's thinking processes.

Descriptive level definitions, which indicate a superficial grasp of underlying concepts, are perhaps not immediately available for recall in an appropriate context, as required for spontaneous expression. Since these concepts are often verbalized in sentence form as well (e.g., triangle - "It has three corners"), they do not readily fill sentence slots and, consequently, the speaker does not have an alternate means of expressing the same concept in a particular environment. The latter disadvantage is shared by functional definitions. On the contrary, the conceptually defined words illustrate depth of understanding and generally are defined in synonym form.

These differences may vary the fluency with which ideas are expressed.

The qualitative vocabulary test, by which the suspected relationship between vocabulary depth and maze usage was investigated in the present research, was based on Gerstein's (1949) assumption that verbal definition is an adequate test of concept development.

Summary

Chapter II examined the maze and its relationship to other language variables. This outline was followed by the identification of two research-based language variables suitable for the measurement of oral language facility. These variables are mean length of response and vocabulary development.

The communication unit (C-unit) was chosen as the measure for mean length of response, while two types of vocabulary tests were used for the determination of vocabulary development. The quantitative vocabulary measure was the Peabody Picture Vocabulary Test, Form A. An adaptation of Feifel and Lorge's (1950) approach was used for the qualitative vocabulary measure. The approach involved the analysis of the responses given to the first fifteen words of the Form L Stanford-Binet vocabulary sub-test.

CHAPTER III

DESIGN OF THE STUDY

Introduction

The research reported in this study was designed to explore the possibility that maze usage might be related to other language variables. For the purpose of identifying significant relationships, if such existed, coefficients of correlation were computed. The following hypotheses guided the investigation:

- (1) There is no significant relationship between total maze usage and the following variables:
 - (a) sentence complexity
 - (b) qualitative vocabulary
 - (c) quantitative vocabulary.
- (2) There is no significant relationship between the use of the above variables and the following maze types:
 - (a) audible pauses
 - (b) repeats
 - (c) edits.

Statistical Analysis

Because the study was exploratory in nature, no attempt was made to identify causal factors. Instead, the purpose of the study was to identify language variables which showed an association with maze usage at a statistically significant level. Such information could then serve future research by indicating where, within the scope of language variables, a search for causal or other underlying factors lay. Conversely, if no significant correlations existed, attempts to define

causes outside the language context might be indicated.

The Descriptive Statistics (DEST02) computer program was used to compute Pearson product-moment correlations among all variables.* The finding of a statistically significant coefficient of correlation would warrant an investigation in one of two directions. Perhaps the two variables were being influenced by the same underlying factor. Kenney and Keeping (1954) referred to correlation in this sense as a two-way average of relationship. Alternately, "it may be that a change in the one variable is the cause of a change in the other" (Kenney and Keeping, 1954, p. 262). For example, if a vocabulary deficiency caused the hesitations as the speaker struggled for words to express his ideas, the latter correlation would be illustrated; if maze usage and sentence complexity were both influenced by underlying thought processes, the former correlation would be illustrated.

The validity of product-moment coefficients of correlation is dependent upon the assumption that the trend of any two variables being compared is linear (Kenney and Keeping, 1954, p. 257). Although maze usage and sentence complexity may not interact in similar ways at different developmental levels, the assumption was made that the one-grade restriction of the present research would result in a linear trend.

* Program developed by the Division of Educational Research Services, Faculty of Education, University of Alberta.

Population and Sampling

The 250 grade four students of Sherwood Park, Alberta comprised the population for the study. From this group, twenty-nine students were selected for the test sample, using a table of random numbers (Clark, 1966). When a subject had to be eliminated, the student who succeeded him, according to the table of random numbers, was added to the sample.

Previous to the data collection, the decision was made to automatically eliminate a child from the sample when the following factors, determined to be present on the basis of the teacher's information and judgment, were present. Subjects for whom English was a second language were excluded since mazes may have resulted from a general lack of familiarity with English grammar or vocabulary. Repeaters were eliminated in an attempt to maintain a certain degree of age consistency. Finally, any indication of a speech defect warranted elimination because of both taping problems and the unique and undetermined effect that this characteristic may have had on maze usage. The above criteria resulted in the elimination of six subjects.

Four other students had to be eliminated from the sample, one because of taping problems, and two on the advise of the teachers, who felt that conditions present at the time of the testing might result in responses which were not representative of the children's normal work. The fourth subject did not produce the required fifty C-units.

The final sample consisted of twenty-nine children, seventeen girls and twelve boys. Their mean age was ten

years, ranging from nine years, five months to eleven years, three months.

Instrumentation

Maze usage scores, a sentence complexity measure, and two vocabulary test scores were required to conduct the research. To obtain these scores, each of the twenty-nine subjects was interviewed individually in May, 1969 for approximately thirty-five minutes. Since the maze and sentence complexity scores were obtained from an analysis of oral language, a variety of stimuli was used to elicit free expression from each subject. For the vocabulary scores, the Peabody Picture Vocabulary Test, Form A and a modified form of the Form L Stanford-Binet vocabulary sub-test were administered.

(1) Oral Language

Collection of samples. Four black and white pictures and two partial filmstrips were used to elicit the oral language. The children were asked to tell the story that each picture brought to their minds. Then each filmstrip was shown twice, first to allow the subjects to think about the total story, the second time as the story was told. A hand viewer was used and, in order to avoid interruptions, the examiner turned the frames at a signal from the children.

Patterned after the approach of O'Donnell et al. (1967), each subject was questioned further following his response to the first filmstrip. "This story is supposed to show that stunt

riding is dangerous. Do you agree or disagree?" (p. 109). After the subject's response, he was asked for an illustration from his experience or reading. (The pictures and filmstrips are described in Appendix B.)

Past research used a variety of situations and stimuli in the collection of oral language (see Figure 2, p.). Consequently, in setting up the situation described above for the elicitation of oral language decisions had to be made regarding the nature of the situation, the stimuli, and the type of questioning to be used. A rationale follows for the choices made.

Oral language research has made use of both the structured, adult-oriented speech environment and the unstructured informal, peer-oriented environment. Since the nature of the setting in which the oral sample is collected will affect the language obtained (Joos, 1961), the differences are important. The choice of the structured situation for the present research was based mainly upon Bernstein's findings (1958). He described two types of language, the "public" and the "formal," and the uses to which these were put. Although he claimed that children of lowest language ability have access only to the public form, he stated that children demonstrating facility with formal language also reverted to the public form in the informal situation. Therefore, an informal peer environment, such as was used in Strickland's study, may not reveal the true extent of differences between subjects of high and low language ability. Furthermore, two members of Strickland's

project team, recognizing the probable effects of different situations upon verbalizations, suggested, for further research, a study of language in a situation conducive to a higher level of speech (Hochstetler, 1961; Shubkagle, 1960).

A second decision related to the type of stimuli to be used in eliciting the oral language. A perusal of the major studies (see Figure 2, p.) revealed that the most common stimuli in the structured situations were films and pictures. Bougere (1968) elicited oral language using these two situation types. Individually interviewing sixty grade one children, she had them view two films, telling about each and responding to the type of interpretive question asked by O'Donnell et al. (1967) in their study. Then the subjects were shown four pictures, to which they responded with their stories. All the resulting oral language samples were analyzed, one measure being mean T-unit length, and the data compared for significance by 2-way analysis of variance. The finding of moderate to low coefficients of reliability from one language sampling situation to the other resulted in the following conclusion by the researcher: "a combination of scores from all three samples would give a more accurate measure of subjects' language facility than if responses to only one stimulus were used." On the basis of Bougere's findings, the fifty C-units analyzed in the present research were obtained from not one stimulus but several -- four pictures and two filmstrips. The substitution of filmstrips for the usual films was a practical decision necessitated by the difficulty of transporting the equipment

needed for film viewing.

The three most recent studies reported in Chapter II attempted to elicit language based upon two types of questioning. Levin et al. (1967) asked their subjects two questions -- "What happened?", to elicit description, and "Why do you think that happened?", to elicit explanation. O'Donnell et al. (1967) asked his subjects to tell stories previously viewed on film, then to agree or disagree with a statement made by the examiner and, finally, to explain their response. Bougere (1968) followed O'Donnell's example. Most of the language elicited in the present study was descriptive. However, patterned after the approach of O'Donnell et al. (1967, p. 109), an attempt was made to obtain explanation by questioning each subject following his response to the first filmstrip with the following comment and question: "This story is supposed to show that stunt riding is dangerous. Do you agree or disagree?" After the subject's response, he was asked for an illustration from his experience or reading which supported his response.

To alleviate undue stress, the subject was encouraged to talk about general topics before the testing began. Since the responses to the pictures and filmstrips were recorded on audio-tape, this conversation included reference to the tape recorder, how it worked and a brief recording session if the student wanted to hear his voice on the tape. The presence of the tape recorder did not appear to produce anxiety, although curiosity was shown toward it.

Objective analysis. All the oral language recorded dur-

ing the interviews was transcribed from the tapes. Then the transcriptions were divided into C-units and the mazes identified and labelled according to type. A sample transcription, along with the guidelines which determined C-unit divisions and maze identification, are contained in Appendix C.

Initially, the segmentation into C-units was to be based solely upon syntactic structure. However, intonation and meaning had to be considered in isolated cases. Loban (1963) also discovered that the use of meaning reinforced his method of segmentation. Although he acknowledged the contention of some linguists that analysis should be determined exclusively upon a structural basis, Loban himself reported that using meaning as a double check produced no problems. "By so doing, some mistakes have been located, no dilemmas have arisen, and the research has retained a closer alliance with the ultimate purpose of language" (p. 7).

From each subject's total response, fifty C-units were selected randomly to comprise the sample for statistical analysis. The result was a random selection of mazes as well because, although the mazes are not considered a part of the C-units, they nevertheless fall within C-unit boundaries.

The above approach was based upon two decisions, the first to limit the sample to fifty C-units, the second to select the C-units randomly from each subject's total response to all the stimuli.

In the earlier language studies which did not analyze total responses, a sample length of twenty-five phonological

units, each containing one or more C-units, or fifty structural units was most common. In 1960, Darley and Moll, recognizing the problem of acquiring a truly representative sample of oral language, attempted to examine the reliability of varying lengths of samples. Their approach was to elicit language protocols from 150 kindergarten children through presentation of the Children's Apperception Test cards. These were then subdivided into ten response segments and an analysis of variance performed. From the results, the reliability coefficients for mean length of response was estimated for each additional segment added to the language sample, to a maximum of fifty segments (250 responses). When the first ten response segments (fifty responses) were included, the reliability coefficient was .85. Darley and Moll considered this reliability coefficient to be adequate for most purposes (p. 171) and, consequently, concluded that language samples of fifty responses are adequate for most research projects.

The reliability which Darley and Moll discussed, however, applied only to the particular type of language sample for which the reliability coefficients were calculated. Their research did not include samples elicited by a variety of stimuli and questioning. Nor did the description of the study indicate whether the same number of pictures were responded to by each subject to obtain the fifty required responses. Bougere (1968) found low to moderate reliability between samples elicited by different stimuli. Levin et al. (1967) compared the hesitancies present in two types of language, des-

cription and explanation, and discovered that the hesitancies of the explanatory situation were greater than those of the descriptive at a statistically significant level. The findings of Bougere and Levin suggest that the content validity of Darley and Moll's research is suspect.

In the present research, a decision to choose consecutive phonological units at the point where the subject was expressing himself fluently, the approach of many earlier studies, would have resulted in some subjects being analyzed on the basis of two or three pictures, excluding their response to the filmstrips and the interpretive question, while other subjects would have been analyzed on the basis of the total of four pictures, two filmstrips, and the interpretive question.

To maintain the highest level of content validity possible within the limitations of the design, therefore, the fifty C-units were chosen randomly from the entire response of each subject, in this way including responses from each stimulus on a basis proportionate to the subject's fluency. The selection procedure chosen also eliminated the need to decide subjectively where to begin choosing the responses that would comprise the final sample.

(2) Vocabulary

Quantitative measure. The Peabody Picture Vocabulary Test, Form A was administered to obtain the quantitative vocabulary score. The test required no verbal response from the subject. For each item, four pictures were shown, the examiner

said the stimulus word, and the subject responded by pointing to or saying the number of the picture best illustrating the word (Dunn, 1965).

The quantitative vocabulary scores assigned to the subjects for use in the statistical analysis were the raw scores they obtained on the PPVT.

Qualitative measure. The first fifteen words of the Stanford-Binet vocabulary list (1960) were used for the qualitative vocabulary test. The procedure outlined in the manual was followed in presenting the words orally to each subject and all responses were taped, then transcribed.

The subjects' responses were classified on the basis of Gerstein's scale (1949), guided by Jackson's (1967, pp. 60-63) subdivisions of the former researcher's three categories. The scale consists of three levels, the lowest form of conceptualization being the descriptive definition, followed by the functional, and, at the highest level, the abstract conceptual definition. Because research had identified the levels as being progressively of a higher qualitative order (Feifel and Lorge, 1950), scores of one, two, and three were assigned to the descriptive, functional, and conceptual definitions. An error received a score of zero.

The sum of the scores obtained for the fifteen definitions became each subject's qualitative vocabulary score for the statistical analysis.

Reliability of Scoring

Twenty-five definitions were chosen randomly from the subjects' responses to the qualitative vocabulary test. Then two judges scored these items on the basis of Gerstein's three levels (Appendix D), using Jackson's subdivisions as an additional source of guidance. The resulting three sets of scores, the researcher's and the two judges', were analyzed for inter-judge reliability, using a single factor experiment with repeated measures (Winer, 1962, pp. 105-132).

The adjusted reliability for the means of the three treatment measurements was .979, with no appreciable difference existing between the adjusted and unadjusted reliabilities (unadjusted reliability = .976). The insignificant variance between the judges' ratings indicates that the scores assigned to the definitions on the qualitative vocabulary test would not be affected appreciably by differences among scorers.

Pilot Study

A pilot study was conducted in March, 1969 at Coronation, Alberta to test the suitability of the device for eliciting oral language. Six grade four subjects were chosen to represent high, average, and low oral language abilities, based on their teacher's judgment.

The proposed device at that time was a collection of pictures taken from the Michigan Apperception Test. However, the responses received were poor, requiring many comments and questions from the examiner. A possible explanation was the lack

of identification with the children in the pictures because the contents clearly labelled them as of an earlier decade. Several pictures were, in fact, identified by the subjects as "old." Consequently, the stimulus was changed to the pictures and filmstrips described in Appendix B.

The amount of maze usage present in the samples indicated that there would be sufficient material in subsequent oral language samples to permit analysis of the individual maze types as well as total maze usage.

The method for taping the sessions was adequate. The tapes were clear enough for ease of transcription and the presence of the recorder and microphone did not appear to produce anxiety in the subjects.

Summary

Chapter III described the design of the study, identifying the two types of analysis used, a statistical and an objective. The rationale which prompted the approaches taken to eliciting the oral language and choosing the C-units for the statistical analysis was presented, along with identification of the testing devices which measured the language maturity variables.

CHAPTER IV

FINDINGS

The previous chapter described the research design and the procedures for data collection and analysis. The present chapter presents the findings of the statistical analysis.

The central concern of the study was the prevalence of maze usage in children's verbalizations in relation to the sentence complexity of the responses and the children's vocabulary development.

Following the objective analysis of the oral language and the selection of the fifty C-units which would comprise each subject's sample, the mazes present within the samples were examined as a total group, then individually according to type. The language variables with which the maze was correlated were sentence complexity and vocabulary.

Maze Usage

O'Donnell et al. (1967) reported that wide ranges of maze usage occurred within every grade in their study. The results of the present research agreed with that finding. The range of maze usage for the twenty-nine grade four subjects of the sample was from two to fifty-six, providing ample data for the intended statistical analysis of total maze usage as well as of the individual maze types. The prevalence of the maze types and their distribution among the subjects are exemplified in Table 7.

A wide range among subjects for all maze types is obvious.

TABLE 7
RANGE OF MAZE USAGE, MEANS AND
STANDARD DEVIATIONS

Maze Type	Range	Mean	S.D.
Total	2-56	22.38	13.27
Audible Pauses	0-20	5.14	4.85
Repeats	0-28	8.28	6.59
Edits	2-26	8.97	5.89

O'Donnell et al. also reported that a few individuals were responsible for the majority of the mazes at any one level in their sample. Since fifteen of the twenty-nine subjects were above the mean for maze usage in the present sample, the above finding did not hold true for the oral language analyzed in the present research.

Total maze usage, since it was the sum of the three subdivisions, correlated significantly with each type, the audible pause, the repeat, and the edit. The subdivisions themselves, however, did not show this consistency. The repeat and the edit, with a common variance of thirty per cent, were significantly related, but the audible pause correlated significantly with neither the repeat nor the edit (Table 8). Likewise, an examination of the correlation coefficients of the maze types and the language variables chosen for comparison revealed that

where a significant correlation did exist only the edit maze was involved. Consequently, the remainder of the chapter will discuss the maze types individually.

TABLE 8
CORRELATION COEFFICIENTS AMONG MAZE TYPES

Maze Types	1	2	3	4
1 Total	1.000	0.579***	0.827***	0.772***
2 Audible Pauses		1.000	0.285	0.192
3 Repeats			1.000	0.548**
4 Edits				1.000

*** Significant at the .001 level.

** Significant at the .01 level.

Variable Intercorrelations

For the purpose of determining the existence of significant relationships between variables, probability levels of .05 or less were accepted. Intercorrelation coefficients among all the variables of the study, along with the identification of significant relationships, are shown in Appendix D.

(1) Sentence Complexity

Among the twenty-nine subjects of the study, mean C-unit length, the sentence complexity measure, varied from 7.26 words per unit to a maximum of 12.28 words. The composite mean was 9.08 (S.D. = 1.29). The latter mean compares with a mean of

7.70 (S.D. = 1.26) for the 246 grade four subjects of Loban's (1963) study.

As shown on Table 9, no predictable relationship existed between sentence complexity and either the audible pause or the repeat maze. However, between sentence complexity and the edit maze, the relationship was significant at the .001 level. (When the effect of I.Q. variation was removed by partial correlation analysis, the resulting correlation coefficient of 0.565 remained significant beyond the .01 level.)

TABLE 9
CORRELATION COEFFICIENTS BETWEEN SENTENCE
COMPLEXITY AND MAZE USAGE

	Total Mazes	Audible Pause	Repeat	Edit
Sentence Complexity	0.297	-0.095	0.141	0.589***

*** Significant at the .001 level.

Interpreting the correlation coefficient as variance, the common variance between sentence complexity and the edit maze was thirty-five per cent. Between the edit maze and the repeat maze, it was thirty per cent. However, since there was no predictable relationship between the repeat maze and sentence complexity it would seem that the edit maze relates differently to each of the two variables.

Since different sources appear to be influencing the edit maze (e.g., the part relating to the repeat having one source; the part relating to sentence complexity having a second source), its further refinement is indicated.

Levin et al. (1967) attempted to subdivide the edit into corrections and incomplete edits. (Insufficient data resulted in the treatment of the edit as one entity.) The divisions he identified may need to be pursued. Alternately, perhaps editing which results in a structural change, for example, for correction of a linguistic inaccuracy (e.g., grammatical or word order), should be distinct from editing which marks a change in vocabulary or topic.

(2) Vocabulary

The quantitative vocabulary measure for each subject was the raw score obtained on the PPVT, Form A. The range was 63 to 109, with a mean of 81.62 (S.D. = 10.48). The mean compares with the standard score norm, at age 9-6 to 10-5, of 75.49 (S.D. = 9.64) (Dunn, 1965, p. 28).

On the qualitative vocabulary test, the highest possible score was 45. The range obtained by the subjects was 9 to 34, with a mean of 24.17 (S.D. = 5.22).

As revealed in Table 10, neither the quantitative nor the qualitative vocabulary measures approached significance in their relationships with any of the maze types.

Loban's (1963) findings had indicated the possibility of a relationship between vocabulary development and maze usage.

TABLE 10
CORRELATION COEFFICIENTS BETWEEN MAZE
USAGE AND VOCABULARY

Vocabulary	Total Mazes	Audible Pause	Repeat	Edit
Quantitative	0.070	0.141	-0.005	0.048
Qualitative	0.090	0.020	0.196	-0.032

He identified two subgroups within his total sample, a high and a low subgroup, and compared the two groups for extent of maze usage, finding that, at any specific grade, the high group consistently used fewer mazes than the low group. Since fifty per cent of the weighting for his selection of two ability groups was allotted to the score on a vocabulary test, it seemed possible that the relationship between language ability, as determined in Loban's study, and maze usage was related to vocabulary ability. No support was given to this hypothesis by the findings of the present study, however.

Loban also stated, "In respect to vocabulary, it seems logical that children with large and readily accessible vocabularies would find expression easier than those with limited vocabularies" (p. 35). On this premise, too, assuming that the presence of mazes is a sign of lack of fluency, a relationship between maze usage and vocabulary ability was suspected. Once again, the present research did not support the hypothesis.

The two vocabulary measures of the study did correlate

significantly with each other (0.518**) but since their common variance was twenty-seven per cent, different sources appear to be influencing a large portion of the two variables. Consequently, a score combining different facets of vocabulary might have provided a more composite measure of the factors which comprise vocabulary development and, therefore, a more accurate picture of the relationship between maze usage and vocabulary development.

Intercorrelations Among Additional Variables

Table 11 contains comparisons which were not included in the hypotheses of the study but which the statistical analysis revealed to be related at significant levels.

TABLE 11
ADDITIONAL VARIABLES SHOWING SIGNIFICANT
RELATIONSHIPS

	2	3	4	5	6	7	8
1 Edits	0.602***						
2 Words/Edit							
3 Qual. Vocab.						0.552**	
4 PPVT						0.370*	
5 C-Unit/50					0.876***		0.384*
6 C-Unit/5							
7 I.Q.							
8 Age							

*** Significant at the .001 level.

** Significant at the .01 level.

* Significant at the .05 level.

(1) Edits and Mean Length of the Edit

The subjects who used the most edit mazes also tended to use the longest edits. This relationship proved to be highly significant ($p < .001$).

(2) Sentence Complexity Measure

In 1937, Davis did a study in which she compared the mean sentence length of a total sample of fifty sentences with the mean of the five longest sentences for the purpose of investigating the latter as a reliable measure of language development. Analysis of the remarks of 5 1/2, 6 1/2, and 9 1/2 year-old children led Davis to conclude the following: "The mean of the five longest remarks shows development so clearly and is so nearly equal in reliability to the mean of the entire sample, that it should be seriously considered as a measure in future studies of language" (p. 73).

Because of Davis' finding and conclusion, the relationship between the mean of fifty C-units and the mean of the five longest C-units was calculated for the present sample. The results substantiated Davis' finding. The correlation coefficient between the two measures was 0.8758, which indicated a common variance of 77 per cent, the highest of the study.

Substitution of the five longest units for the fifty unit sample would not be advisable in a further investigation of sentence complexity and the edit maze, however. Although both measures related significantly to the edit maze, the common variance between the means of fifty unit samples and

edit maze usage was 35 per cent. Between the means of the five unit samples and edit maze usage it was 25 per cent. The substitution would result, therefore, in a loss of 10 per cent common variance at a time when the need is for a refinement of measures.

(3) I.Q.

The Lorge-Thorndike Level 3A Verbal intelligence test was administered on a county-wide basis in the Sherwood Park area, which resulted in the availability of I.Q. scores as a variable for all the children in the sample. Table 12 shows the I.Q. range, mean, and standard deviation among the research subjects.

TABLE 12
I.Q. AND AGE STATISTICS OF THE
RESEARCH SUBJECTS

	Range	Mean	S.D.
I.Q.	85-133	111.17	11.12
Age (in months)	113-135	119.76	4.41

The lack of a predictable relationship between I.Q. and sentence complexity was as expected on the basis of previous findings (Hochstetler, 1961; Strickland, 1962; Bougere, 1968). Although intelligence is frequently equated with academic

achievement, in the area of syntactic development factors other than intelligence appear to be operating.

Findings by Bernstein and Hess-Shipman suggested that home background, especially the linguistic background, might be a fruitful area of investigation in the isolation of possible factors. Bernstein (1961) theorized the existence of a significant relationship between language structure and the structure of the social system and the family. The postulate was supported by his research (1958; 1960). Similarly, Hess and Shipman (1965) found a consistent relationship between socioeconomic status and the complexity of syntactic structures.

The vocabulary measures were the only variables with which I.Q. related at a significant level, a not unusual finding. For example, the highest correlation coefficient of Loban's (1963) study was between his measures of vocabulary and intelligence ($r = .844$).

(4) Age

Since a survey of the subjects' ages revealed a spread of twenty-two months (Table 12), the significant relationship discovered between edit maze usage and sentence complexity was checked for significance when age was controlled. The previous correlation coefficient had been 0.5894; the correlation coefficient with age controlled was 0.5491. Although five per cent of the common variance was removed, when the effect of age differences was removed, the relationship between the edit maze and sentence complexity remained significant at the .01

level.

The existence of a positive relationship between mean length of response and age/grade was a consistent finding of previous oral language research (for example, Templin, 1957 and O'Donnell et al., 1967). The statistical correlation calculated in the present research revealed a similar trend. The coefficient of correlation between mean C-unit length and age was 0.3845, significant at the .05 level. Alternately, past research had not found a consistent trend between maze usage and age. Nor did maze usage and age correlate significantly in the present calculations. (The correlation coefficient between total maze usage and age was 0.0370; between the edit maze and age it was 0.2599. Neither calculation reached a predictable level of significance.) Furthermore, while sentence complexity shared a common variance of fifteen per cent with age, and a common variance of thirty-five per cent with edit maze usage, the fifteen per cent common variance between sentence complexity and age was not shared with the third variable, the edit maze. The original hesitancy to include maze usage, along with mean C-unit length, as a measure of linguistic maturation appears to be supported.

Discussion of Hypotheses

Hypothesis 1: There is no significant correlation between total maze usage and the three language variables chosen for examination in this study.

The null hypothesis was accepted. As noted previously, total maze usage as a variable was too gross a measure for an

investigation into relationships between hesitancies and other language variables.

Hypothesis 2(a): There is no significant correlation between use of the noise maze and the three language variables of the study.

The null hypothesis was accepted. For none of the variables was a significant relationship found to exist with the noise maze. In each case the correlation was so low (the range was from -0.005 to 0.196) that further investigation of possible relationships between the noise maze and qualitative and quantitative vocabulary or sentence complexity was not indicated.

The finding that the noise maze was not operating in a way similar to other maze types investigated was consistent with Strickland's observations across three grade levels. From grade one to grade three, the repeat and edit mazes decreased in frequency. During the same period, use of the noise maze increased.

Insight into this maze type may be obtained by correlating it with variables in fields other than language development.

Hypothesis 2(b): There is no significant correlation between use of the repeat maze and the three language variables in the study.

The null hypothesis was accepted. The small correlation coefficients gave no indication that the children's vocabulary development or sentence complexity was being influenced from the same source as that of the repeat maze. As was suggested for the noise maze, an attempt to find a relationship with factors outside the realm of language development may be more rewarding.

Hypothesis 2(c): There is no significant correlation between use of the edit maze and the three language variables of the study.

The null hypothesis was accepted for the two vocabulary variables but was rejected for the sentence complexity variable. The specific findings were discussed earlier in the chapter.

Summary of the Findings

- (1) A coefficient of correlation at the .001 level of significance existed between the complexity of the sentences used by the subjects and the number of edit mazes present. The significance continued with age and I.Q. controlled.
- (2) A correlation coefficient significant at the .05 level existed between sentence complexity and the mean length of the edit maze.
- (3) No significant relationships existed between use of the edit maze and qualitative or quantitative vocabulary.
- (4) Total maze usage was not a useful variable. The maze divisions of the study provided some of the refinement needed, but further subdivision of at least the edit maze was indicated by the findings.
- (5) The mazes labelled audible pause and repeat did not correlate significantly with any of the language variables, sentence complexity or qualitative and quantitative vocabulary. The repeat maze correlated with the edit maze at the .01 level of significance, however.
- (6) Mean length of the edit maze and number of edit mazes used had a coefficient of correlation significant at the .001

level. They had in common a significant relationship with sentence complexity ($p < .001$ and $.05$ respectively), and the absence of a significant relationship with the vocabulary measures.

- (7) The mean length of a fifty C-unit sample taken from each subject's total utterance was significantly correlated with the mean length of the five longest C-units of that utterance.
- (8) The inclusion of measures for both qualitative and quantitative vocabulary added no information to the study. Their intercorrelation was at the $.01$ level of significance and both variables correlated significantly with intelligence ($p < .01$ and $.05$ respectively) but with none of the maze types.
- (9) A negatively directed, though not significant, relationship existed between sentence complexity and intelligence.

CHAPTER V

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Summary

The design. Oral language samples of twenty-nine students chosen randomly from the grade four population of Sherwood Park, Alberta were analyzed for maze usage and sentence complexity. A statistical analysis of the results, along with scores obtained on quantitative and qualitative vocabulary tests, yielded correlation coefficients and probability scores.

Findings. A significant correlation existed between the sentence complexity of the subjects' oral language and their use of the edit maze. Significance was also reached between sentence complexity and total maze usage, but the degree of significance was decreased because of the inclusion of repeats and audible pauses, since neither of these maze types individually correlated with complexity.

The hypothesized relationship between vocabulary and maze usage was not substantiated by the research.

Conclusions

A relationship was found between sentence complexity, as measured by mean length of the communication unit, and use of the edit maze, although no statements can be made about the nature of such a relationship from an exploratory study. That

this might be a fruitful area of investigation is, however, indicated.

Conversely, that further investigation into possible relationships between vocabulary and maze usage would increase our understanding of the maze phenomenon is not indicated by the consistently low coefficients of correlation between the vocabulary measures and all maze types.

Implications

The assumption that maze usage correlates negatively with language maturity was not substantiated in the research findings, therefore supporting the initial proposition that our present knowledge of the maze is insufficient to justify its use as a language development measure. Likewise, attempts to eradicate its presence in oral language are not justified until the nature of its interaction with other variables has been established.

Before decisions regarding the significance of the maze can be made, questions such as the following require answers: Is the relationship between the edit maze and sentence complexity causal? Does the relationship between the two variables differ according to the developmental level of the subjects? (The 1963 Loban study indicated that it may.) Would use of the edit maze change following a program which increased syntactic complexity? Until the answers to these and other questions have been obtained, caution should be exercised when information related to maze usage is interpreted.

The discovery of a correlation between the edit maze and sentence complexity opens a new avenue for exploration. The sentence of greater complexity may represent the expression of more complex relationships or of a greater number of relationships. The significant factor in a correlation between sentence complexity and the edit maze, therefore, may be the nature and complexity of the thought patterns which the linguistic structures are expressing, combined with the speaker's mastery of the thought patterns and linguistic structures involved. Levin et al.'s (1967) findings suggest that degree of mastery may be a factor influencing hesitations. From their discovery that subjects who had immediate explanations available to the questions requiring explanation used fewer hesitations than did subjects who had to construct their responses, they concluded that "the hesitations in speech inversely mirror the automaticity of the cognitive process" (p. 564).

The maze, if further research did substantiate the above speculation, may also be the type of feature which could provide insight into language performance. Lyons (1970) seemed to be alluding to the possibility when he stated that deviations from the grammatical norm (including what has been labelled the maze in the present research), "when properly analyzed, may give him (the psychologist) some insight into the structure and operation of the mechanisms underlying the use of language" (p. 95).

Recommendations for Further Research

- (1) Research into the nature of the relationship existing between edit maze usage and sentence complexity is needed. Is a causal factor involved? If so, does the relationship vary according to the developmental level? Could high maze incidence at one level of language development correlate positively with language maturity while at another level correlate negatively?
- (2) The reliability of the C-unit as a measure of syntactic complexity requires further research. Since C-unit combines clause length and number of clauses per unit, required are investigations which will (a) reveal the relative significance of clause length and subordination index in determining the complexity of an utterance and (b) provide insight into the relative difficulty of the various transformations present within the clause. On the basis of O'Donnell's findings with written language (1968b), the relative importance of clause length and subordination index can be expected to differ at various developmental levels. Variations in the complexity of different transformations in written language (Fagan, 1968) intimate that, in the oral language realm, a similar situation may exist as well.
- (3) Following definition of the interaction between linguistic structures and thought patterns, a further investigation into the suspected interaction between linguistic structures and edits is required to discover if structures

representing certain thought patterns correlate more highly with edits than do others.

- (4) A limitation of the present research was the inability to determine how representative of the subjects' language were the oral language samples finally chosen for analysis. Also, considering Bougere's (1968) finding that a comparison of one language sampling situation to another yields moderate to low coefficients of reliability, the diverse ways in which the oral language samples were obtained was a major problem in correlating research projects. As Bougere emphasized, a solution to the problem of obtaining adequate oral language samples should precede further research of the type being suggested.
- (5) During the initial planning of the research, self concept was included as a variable. However, it was eliminated when an investigation of available self concept tests revealed that there was extensive uncertainty as to what each test was actually measuring. Therrien (1969) summed up the problem in the following way: "Until valid and reliable instruments are available, the results of research relating the self concept with behavioral variables will remain suspect" (p. 99).

With the use of the presently available tests, several correlations have been found between self concept and academic achievement (Caplin, 1968; Paschal, 1968; Sopis, 1965). For example, Paschal discovered a stronger association between self concept and subjects that empha-

sized verbal skills, in contrast to subjects that were not verbally oriented. The above findings suggest that the investigation of self concept and maze usage (particularly the holder, audible pause and repeat) should receive further attention when the instruments for measuring self concept have been refined.

BIBLIOGRAPHY

BIBLIOGRAPHY

- Artie, D. and Giles, D. A comparison of the oral language development of head start pupils with non-head start pupils. Unpublished research report, U.S. Department of Health, Education, and Welfare, Office of Education, 1966.
- Bernstein, B. Some sociological determinants of perception. British Journal of Sociology, 1958, 9, 159-174.
- Bernstein, B. Language and social class. British Journal of Sociology, 1960, 11, 271-276.
- Bernstein, B. Social class and linguistic development: A theory of social learning. Cited by A.H. Halsey, J. Floud, and C.A. Anderson (Eds.), Education, economy, and society, A reader in the sociology of education. New York: The Free Press, 1961.
- Bougere, M.B. Selected factors in oral language related to first-grade reading achievement. Unpublished doctoral dissertation, University of Chicago, 1968.
- Buros, O.K. The sixth mental measurements yearbook. New Jersey: The Gryphon Press, 1965.
- Caplin, M.D. Self concept, level of aspiration, and academic achievement. Journal of Negro Education, 1968, 37(4), 435-439.
- Clark, C.E., comp. Random numbers in uniform and normal distribution, with indices and subsets. San Francisco: Chandler Publishing Co., 1966.
- Cleveland, J.A. The relationship of directed verbal practice and language facility in kindergarten children. Unpublished doctoral dissertation, Wayne State University, 1966.
- Darley, F.L. and Moll, K.L. Reliability of language measures and size of language sample. Journal of Speech and Hearing Research, 1960, 3(2), 166-173.
- Davis, E.A. Mean sentence length compared with long and short sentences as a reliable measure of language development. Child Development, 1937, 8(1), 69-79.
- Degraff, R.A. A comparison of the structure of oral language at the first, third, and fifth grade levels. Unpublished doctoral dissertation, University of Indiana, 1961.

- Dixon, J. Growth through English. Reading, England: National Association for the Teaching of English, 1967.
- Dunn, L.M. Expanded manual for the Peabody Picture Vocabulary Test. Minneapolis: American Guidance Service, 1965.
- Ebel, R.L. (Ed.). Encyclopedia of educational research, 4th Edition. A Project of the American Educational Research Association. London: The MacMillan Co., 1969.
- Fagan, W.T. An investigation into the relationship between reading difficulty and the number and types of sentence transformations. Unpublished doctoral dissertation, University of Alberta, 1969.
- Feifel, H. and Lorge, I. Qualitative differences in the vocabulary responses of children. Journal of Educational Psychology, 1950, 41(1), 1-18.
- Francis, S.E. An investigation of the oral language of first grade children. Unpublished doctoral dissertation, University of Indiana, 1962.
- Gerstein, R.A. A suggested method for analyzing and extending the use of Wechsler-Bellevue vocabulary responses. Journal of Consulting Psychology, 1949, 13, 366-370.
- Gunderson, D.V. Common flaws in design. Cited by J.A. Figurel (Ed.), Vistas in reading, Proceedings of the Eleventh Annual Convention of the International Reading Association, 1967, 11(1), 464-467.
- Harrell, L.E. A comparison of the development of oral and written language in school-age children. Monographs of the Society for Research in Child Development, Inc., 22(3), serial No. 66, 1957.
- Hess, R.D. and Shipman, V.C. Early experience and the socialization of cognitive modes in children. Child Development, 1965, 36, 869-886.
- Hochstetler, R.J. An analysis of the oral language of fifth grade children in guided situations. Unpublished doctoral dissertation, University of Indiana, 1961.
- Hunt, K.W. Grammatical structures written at three grade levels. National Council of Teachers of English Research Report No. 3. Champaign, Ill.: National Council of the Teachers of English, 1965.
- Jackson, R.K. The relationship between knowledge of core and specialized vocabulary. Unpublished master's thesis, University of Alberta, 1968.

- Joos, M. The five clocks. New York: Harcourt, Brace and World, 1961.
- Kenney, J.F. and Keeping, E.S. Mathematics of statistics, Part one. 3rd Edition. Toronto: D. Van Nostrand Co., 1954.
- Khater, M.R. The influence of social class on the language patterns of kindergarten children. Unpublished doctoral dissertation, University of Chicago, 1951.
- Levin, H., Silverman, I. and Ford, B. Hesitations in children's speech during explanation and description. Journal of Verbal Learning and Verbal Behavior, 1967, 6, 560-564.
- Loban, W.D. The language of elementary school children. National Council of Teachers of English Research Report No. 1. Champaign, Ill.: National Council of Teachers of English, 1963.
- Lyons, J. Noam Chomsky. New York: The Viking Press, 1970.
- McCarthy, D. Language development in children. Cited by L. Carmichael (Ed.). Manual of child psychology, 2nd Edition. New York: John Wiley and Sons, 1954, 492-630.
- Menyuk, P. Syntactic structures in the language of children. Unpublished doctoral dissertation, University of Boston, 1961.
- Munkres, A. Helping children in oral communication. Practical Suggestions for Teaching, No. 19. New York: Bureau of Publication, 1959.
- Nice, M.M. Length of sentences as a criterion of a child's progress in speech. Journal of Educational Psychology, 1925, 16, 370-379.
- O'Donnell, R., Griffin, W. and Norris, R. Syntax of kindergarten and elementary school children: A transformational analysis. National Council of Teachers of English Research Report No. 8. Champaign, Ill.: National Council of Teachers of English, 1967.
- O'Donnell, R. Language development in school-age children. Mimeographed paper prepared for the CEE, 1968a.
- O'Donnell, R. An objective measure of structural complexity in children's writing. Mimeographed paper presented at the annual meeting of the AERA, 1968b.
- Paschal, B.J. The role of self concept in achievement. Journal of Negro Education, 1968, 37(4), 392-396.

- Reichard, S., Schneider, M. and Rapaport, D. The development of concept formation in children. American Journal of Orthopsychiatry, 1944, 14, 156-161.
- Riling, M.E. Oral and written language of children in grades four and six compared with the language of their textbooks. U.S. Office of Education, Cooperative Research Project No. 2410. Oklahoma, 1965.
- Ruddell, R.B. An investigation of the effect of the similarity of oral and written patterns of language structure on reading comprehension. Unpublished doctoral dissertation, University of Indiana, 1963.
- Shubkagle, R.F. An analysis of the oral language of third grade children. Unpublished doctoral dissertation, University of Indiana, 1960.
- Sopis, J.F. The relationship of self image as a reader to reading achievement. Unpublished doctoral dissertation, University of New York, 1965.
- Strickland, R.G. The language of elementary school children: Its relationship to the language of reading textbooks and the quality of reading of selected children. Bulletin of the School of Education, Indiana University, 1962, 38(4).
- Templin, M.C. Certain language skills in children: Their development and interrelationships. Minneapolis: The University of Minnesota Press, 1957.
- Terman, L.M. and Merrill, M.A. Stanford-Binet Intelligence Scale, Manual for the third revision, Form L-M. Boston: Houghton Mifflin Co., 1960.
- Therrien, S.A. Self concept: Implications for early childhood education. Unpublished master's thesis, University of Alberta, 1969.
- Winer, B.J. Statistical principles in experimental design. Toronto: McGraw-Hill Book Co., Inc., 1962, 105-132.
- Young, F.M. An analysis of certain variables in a developmental study of language. Contribution to Education, 309. Tennessee: George Peabody College for Teachers, 1941.

APPENDICES

APPENDIX A

CORRELATION COEFFICIENTS AMONG VARIABLES

N=29

Variable	1	2	3	4	5	6	7
1. Total Mazes	1.000	0.579***	0.827***	0.772***	0.526**	0.090	0.070
2. Audible Pauses		1.000	0.285	0.192	0.130	0.020	0.141
3. Repeats			1.000	0.548**	0.424*	0.196	-0.005
4. Edits				1.000	0.602***	-0.032	0.048
5. # of Words/Edit					1.000	0.138	0.115
6. Qualitative Vocabulary						1.000	0.518**
7. PPVT							1.000
8. Self Concept							
9. C-Unit Length/50							
10. C-Unit Length/5 Longest							
11. Fluency (Total # C-Units)							
12. I.Q.							
13. Age							

*** Significant at the .001 level.

** Significant at the .01 level.

* Significant at the .05 level.

N=29		8	9	10	11	12	13
Variable							
1.	Total Mazes	-0.008	0.297	0.264	-0.165	-0.118	0.037
2.	Audible Pauses	-0.008	-0.095	0.003	-0.099	-0.043	-0.074
3.	Repeats	-0.081	0.141	0.084	-0.126	-0.005	-0.103
4.	Edits	0.078	0.589***	0.499**	-0.150	-0.225	0.260
5.	# of Words/Edit	0.077	0.440*	0.308	-0.214	-0.181	0.153
6.	Qualitative Vocabulary	0.359	0.029	-0.117	0.077	0.552**	-0.195
7.	PPVT	0.078	0.167	0.160	0.022	0.370*	-0.058
8.	Self Concept	1.000	0.225	0.220	0.170	0.070	-0.083
9.	C-Unit Length/50		1.000	0.876***	-0.010	-0.249	0.385*
10.	C-Unit Length/5 Longest			1.000	-0.115	-0.365	0.403
11.	Fluency (Total # C-Units)				1.000	0.198	-0.098
12.	I.Q.					1.000	-0.264
13.	Age						1.000

*** Significant at the .001 level.

** Significant at the .01 level.

* Significant at the .05 level.

APPENDIX B

1

A DESCRIPTION OF THE ORAL LANGUAGE STIMULI

The four black and white pictures and the two filmstrips which were chosen for use with the subjects of the study are described below. The first two pictures had been used successfully with grade six students.* With the grade four subjects of the present study, however, the two pictures described last elicited a better response. The two filmstrips were chosen for their color, action, and cartoon-type illustrations which were expected to be appealing to grade four children.

- (1) In the first picture shown to the subjects, a prospector was leading a well-laden donkey toward a range of mountains which appeared in the distance. The surrounding area had the physical features of a desert.
- (2) The second picture was that of a wolverine standing in front of a log cabin. He was eating what appeared to be a piece of meat which he had apparently stolen from a storage shed attached to the cabin.
- (3) In the third picture, a kitten, who obviously had just been lifted from a pan of spaghetti, was being held on a large spoon. Spaghetti still hung from his ears and had spilled over the sides of the pan.

This picture was the only one which the children reacted to as a comical scene.

* Personal communication with Dr. P. McFetridge, University of Alberta, regarding a project done in 1968.

- (4) The final picture showed a bear standing in a garbage can in what appeared to be a park area.
- (5) The first filmstrip, consisting of five frames, portrayed the adventures of a girl who was doing stunt riding on a bicycle. The interpretive question mentioned in Chapter III was asked following the subject's narrative response.
- (6) The second filmstrip portrayed, in a series of sixteen frames, the narrative of a mouse who convinced his grandfather to take him to a fair, only to be asleep when they finally arrived.

APPENDIX C

SAMPLE TRANSCRIPTION OF THE ORAL
LANGUAGE ELICITED

= C-unit boundary E = edit maze
 [] = maze R = repeat
 — = partial sentence A = audible pause

one sunny day ^R [a little] a little girl was walking ^R [alo]
 along the sidewalk and walked right past a garbage can #
^E [she didn] she saw something black in it # but she thought it
 was just a pig pile of dirt that someone had put in there from
 their garden # ^E [as she was she was going ba] as she was coming
 back she saw ^E [something] their head sticking out # ^R [she] she
 walked up a little closer and found out it was a bear # she
 started holdering # and her father came out to see what was the
 matter # the bear started slowly crawling out of the garbage can
 but found out he couldn't get out # ^E [they started they they] it
 was ^R [qu] quite a tame bear # and soon they ^E [star] thought of
 something to do # they got something to cut the garbage can
 apart so thatthe bear could crawl out # they got it # and
^E [the little g the bear the] the little girl had the bear for
 a pet #

The information provided by the definitions of the C-unit and the maze were adequate for the majority of the analysis. However, relatively arbitrary decisions were required in

certain instances. To standardize the procedures for all subjects, the following guidelines were adopted.

Guidelines for C-Unit Divisions

= C-unit boundary (# #) = C-unit within the boundaries of a second C-unit

___ = partial sentence () = addition to subject's verbalization

- (1) "So" began a new C-unit if it could be substituted with "therefore."

e.g., (a) # she said you're a baby # so I tried #
(2 C-units).

(b) # I came so I could help you # (1 C-unit).

- (2) When a quote consisted of more than one principal clause, only the first one was included with the words that identified the speaker.

e.g., # christopher said uncle when shall we get there #
it's such a long walk #.

- (3) Non-sentences were underlined and disregarded in the choosing of C-units for the samples.

e.g., # was dressed up #

- (4) Having a C-unit within a C-unit was possible.

e.g., # and he (# what's that there now #) told the... #.

- (5) Clauses were contained in the same C-unit if they formed a sequence of more than two.

e.g., # christopher changed ate his breakfast and then
his uncle packed him and christopher a lunch #.

- (6) When the meaning of a passage indicated that a subordinate conjunction had been omitted, the clause involved did not form a new C-unit.

e.g., # he decided that he should go cause there was nobody around and (cause) there was stuff... #.

- (7) "Yes" was included in the succeeding C-unit if the following statement was an elaboration of the answer; otherwise, it was considered to be a partial.

e.g., (a) # yes I guess you missed... #

(b) # yes # what do you want it for #.

- (8) When "except" was synonymous with "but" it began a new C-unit.

- (9) Incomplete statements made in reply to another speaker in the story or to a comment by the examiner were identified as partials and omitted.

e.g., # so am I #.

- (10) Intonation determined the location of the boundary when a phrase, structurally, could be attached to either the preceding or subsequent C-unit.

e.g., "I think" in # he went I think # he said he planned to anyway #.

Guidelines for Maze Identification

- (1) If more than one type of maze appeared together, the total maze was identified as an edit if the edit appeared with a repeat or an audible pause. The maze was identified as a repeat if a repeat and an audible pause appeared together.

- (2) Speech idiosyncracies were not labelled as mazes.
e.g., "the boys" in # the boys they... # or
"like" in # ...through the like hoodoos or
mountains #.
- (3) Mazes that were contained within the boundaries of partial sentences were omitted along with the partials.
- (4) "Well" was included as part of the maze only when it appeared within the boundaries of a maze.

APPENDIX D

A SAMPLING OF THE RESPONSES TO THE QUALITATIVE VOCABULARY MEASURE

Scale: (Gerstein, 1949)

Descriptive (1 point) - implies memory of an object at the concrete, sensory level, e.g., cushion: "something soft and comfortable."

Functional (2 points) - defined by the subject recalling the use to which that object was put in the past, e.g., cushion: "you sit or lie on it."

Categorical (3 points) - abstract method, in terms of class, e.g., cushion: "pillow."

Vocabulary Item	Subject's Definition	Classifi- cation
orange	it could be a color or something that you eat	3
gown	something that you wear, a long dress	3
gown	something you wear	2
juggler	he juggles oranges or anything around in a circle	1
eyelash	is on your eyelid; it grows there	1
brunette	hair product or something like that	0
lecture	no response	0

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